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AN ANALYSIS OF THE FACTORS AFFECTING MARINE CORPS OFFICER RETENTION

by

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This thesis examines factors which influence the retention of male, company-grade Marine Corps officers (grades O-1 to O-3) who are within their initial period of obligated service. Data used combined responses from the *1985 DOD Survey of Officer and Enlisted Personnel* and the respondents' 1989 status from the officer master file maintained by the Defense Manpower Data Center (DMDC). Logit regression was used to measure the relative importance of a broad range of factors for retention. These included: biographic and demographic characteristics, tenure data, perception of external job opportunities, and satisfaction with various aspects of military life. Results indicate that the individual's marital/dependant status, commissioning source, military occupational specialty, race, and satisfaction with specific intrinsic and extrinsic aspects of the military job are most important in predicting the retention behavior of junior Marine Corps officers with no less than 12 months of service and no more than seven and one-half years of active service. These findings can provide manpower planners with information to project and manage future retention levels of company-grade officers and to identify possible shortfalls in critical occupational specialties.

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An Analysis of the Factors Affecting Marine Corps Officer Retention

by

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ABSTRACT

This thesis examines factors which influence the retention of male, company-grade Marine Corps officers (grades O-1 to O-3) who are within their initial period of obligated service. Data used combined responses from the *1985 DOD Survey of Officer and Enlisted Personnel* and the respondents' 1989 status from the officer master file maintained by the Defense Manpower Data Center (DMDC). Logit regression was used to measure the relative importance of a broad range of factors for retention. These included: biographic and demographic characteristics, tenure data, perception of external job opportunities, and satisfaction with various aspects of military life. Results indicate that the individual's marital/dependant status, commissioning source, military occupational specialty, race, and satisfaction with specific intrinsic and extrinsic aspects of the military job are most important in predicting the retention behavior of junior Marine Corps officers with no less than 12 months of service and no more than seven and one-half years of active service. These findings can provide manpower planners with information to project and manage future retention levels of company-grade officers and to identify possible shortfalls in critical occupational specialties.

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I. INTRODUCTION

In order for the Marine Corps to fulfill its assigned mission within national defense, it must attract, train, and retain qualified personnel. As the costs to recruit and to train personnel continue to rise, it will become increasingly important to ensure not only that these people fulfill their initial obligated service requirement but also that the best performers are encouraged to remain on active duty beyond their initial obligated service requirement.

Maintaining qualified, highly trained personnel throughout all ranks and occupational specialties is of major importance to manpower policy makers. Marine Corps policy makers are located at Headquarters, U.S. Marine Corps in Washington, D.C., and are headed by the the Deputy Chief of Staff for Manpower. As stated in MCI 7701E, the Department of Defense course for the Command and Staff College (Non-Resident Program):

> The Deputy Chief of Staff for Manpower (DC/S Mpr) assists...in planning, directing, coordinating, and supervising Headquarters staff agencies on all matters relating to manpower planning, budgeting, policies and programs, personnel research and information systems, manpower management and administration, to include cognizance over Marine Corps military personnel....

In performing his mission, the DC/S Mpr and his staff must implement policies in order to meet mandated force levels and to achieve the desired quality within that force structure. In doing so, they must consider the significant factors which affect the individual's decision to remain on active duty. If these factors are known beforehand, then policy

decisions can be targeted directly towards the most influential factors. The individual will then be more likely to continue to serve and be more likely to choose the military as a career. As more Marines choose to remain on active duty, this increase in retention will reduce required training costs due to personnel turnover.

A. BACKGROUND

This thesis focuses specifically on the retention of junior Marine Corps officers who are serving within their initial obligated service requirement. These officers are directly responsible for the supervision, management, and training of our enlisted Marines on a daily basis. The performance of these officers in carrying out their responsibilities ultimately affects the readiness capabilities of all marine combat and combat support units.

As weapons systems and support equipment become more complex, additional and more costly training is required. The more training and experience an individual Marine officer receives, the greater the investment for the Marine Corps. The individual officer also becomes more costly to replace. All Marine Corps officers attend the Basic School at Quantico, Virginia for six months and then attend follow-on Military Occupational Specialty (MOS) training, which can last from as little as two months for infantry officers to as much as two years for some pilots.

Unlike the corporate world, the services do not normally accept lateral entry into their organizational system. Almost all personnel are inducted at a lower entry level and grow through promotions to fill positions of increased authority and responsibility. The only exceptions

are military doctors and lawyers, but they do not represent a large percentage of the officer ranks, especially in the Marine Corps.

Maintaining qualified, highly trained personnel throughout all ranks and occupational specialties of the officer corps contributes to the combat readiness of the entire service. In order to fill the more senior ranks, the services must retain and promote a certain percentage of their junior officers. This requires that retention levels be predicted for all ranks so that billet vacancies at higher levels can be filled and managed appropriately. The initial number of people required to staff the officer corps can be minimized if retention rates can be estimated with accuracy and if promotion rates are maintained at predictable levels.

Retention rates can be managed successfully in both expansion and reduction scenarios if the factors which affect retention are known beforehand and if policy makers have some control over the individual factors. By monitoring the retention of officers and the factors affecting their decision to remain on active duty, manpower officials can project future retention levels and plan for shortfalls in critical occupational specialties.

B. PURPOSE

The purpose of this thesis is to construct and test a multivariate model of the career orientation of junior Marine Corps officers. This model examines the effects of various factors on the retention of male, junior Marine Corps officers. Retention is the individual officer's decision to remain on active duty beyond his initial obligation. Cross-tabulations, frequency analysis, and logit regression were used to examine variables.

which included working conditions, individual and demographic characteristics, worker/employer expectations, co-worker relationships, and alternative job opportunities.

This thesis utilizes responses to the *1985 DOD Survey of Officer and Enlisted Personnel* and also uses personnel data from the Defense Manpower Data Center (DMDC) for estimating the model. DMDC used 1989 personnel records to create a Matched Member File for all respondents of the 1985 survey by matching social security numbers. This file was created to obtain information about subsequent behavior of the 1985 respondents.

The primary research questions are:

- What are the factors which affect the career orientation of junior Marine Corps officers who are within their initial period of obligated service?
- What relative importance do these factors have for their decision to remain on active duty?
- How do these factors differ among Military Occupational Specialty (MOS) groupings?

Junior Marine Corps officers who are within their initial period of obligated service are the subjects of this study. The length of this initial period of obligation will vary between three and seven and a half years, depending on occupational specialty and/or commissioning source. As stated above, all Marine Corps officers attend the Basic School at Quantico, Virginia for six months and then attend follow-on MOS-specific training, which can last from as little as two months for infantry officers (MOS 03XX) to as much as two years for some pilots (MOS 75XX). Commissioning sources include Officer Candidate School (OCS), Service

Academies, Reserve Officer Training Corps (ROTC), and Platoon Leader's Course (PLC), each with different initial obligated service requirements.

For the purpose of this study, company-grade officers with less than seven and a half years of service are considered to be junior officers. Company-grade officers are Second Lieutenants (O-1), First Lieutenants (O-2), and Captains (O-3). Warrant Officers (W-1 through W-4) and Majors (O-4) and above are not included in this study because the majority of these officers have already completed their initial service obligation. Officers with less than 12 months of service are also not included. These officers either have not completed training or are not considered to have had sufficient time in an operational environment to make informed career decisions. MOS groupings are Combat Arms, Combat Support, Aviators (Pilots & Naval Flight Officers), and Aviation Support. This permits examination of how important factors vary between occupational specialties.

The methodology used in this thesis closely follows a 1987 thesis by Raymond J. Ashcraft entitled *An Analysis of the Factors Affecting the Career Orientation of Junior URL Naval Officers.* The data used by Ashcraft also came from the *1985 DOD Survey of Officer and Enlisted Personnel,* but this thesis also uses data from DMDC on actual retention.

Multivariate regression analysis was employed to explain differences in retention behavior of the officers being studied. Factor analysis was employed to reduce the total number of explanatory variables and to identify meaningful dimensions among groups of questionnaire responses. The SAS statistical package was used to analyze the data.

Logistic regression was used in the analysis and formulation of the model.

The dependent variable was derived from the DMDC data on actual retention. DMDC maintained a master file of the original respondents to the 1985 survey and recorded their military service status as of 1989. Explanatory variables came from selected responses to the 1985 survey. Several of the explanatory variables used in the analysis were responses to questions concerning aspects of job satisfaction and turnover. These variables were expected to influence the individual officer's decision to remain on active duty.

As stated above, the management of Marine officers falls under the mission of the DC/S Mpr and his staff. As a result of this study, Marine Corps manpower officials will have a model to identify the factors which affect the career orientation of junior officers. This thesis can serve as a management tool for manpower policy makers. It will enable them to estimate retention rates and future force structure based on the likelihood that junior officers will remain on active duty beyond their initial service obligation. It provides information which can be used to make informed, effective policy decisions.

II. REVIEW OF LITERATURE

A. INTRODUCTION

This thesis focused on the retention of junior Marine Corps officers who are serving within their initial obligated service requirement. "Retention is defined as voluntary decisions on the part of individuals to remain in the military for additional terms of service" [Ref. 1:p. 2].

These decisions are different for officers than they are for enlisted members. For enlisted personnel, these decisions come at specific times within an individual's military career. Enlisted personnel join the service of choice for a contracted period of time, from two years for some Army occupational specialties to as much as six years for some Navy and Air Force specialties. The six-year obligations are for specialties where "training is long and civilian transferability of acquired job skills is greatest." [Ref. 1:p. 10] Once the contracted service requirement is fulfilled, the enlisted member makes one of three choices: (1) extend or reenlist for another specific period of obligated service, (2) leave the active force and join one of the Reserve forces (again for some specific period of obligated service), or (3) leave the service altogether.

For officers, the situation is different in some respects. Upon entry into the service, new Ensigns or Second Lieutenants also agree to remain on active duty for a specific period of time. However, once they reach their End of Obligated Service (EOS), officers can continue to serve on

serve on active duty without incurring another contracted period of obligated service.

The ability to remain on active duty depends on the type of commission. Officers with Regular commissions can continue indefinitely as long as they are promoted. Officers with Reserve commissions must apply to be "augmented" into the Regular officer corps or apply for extensions. Marine augmentation boards have been extremely competitive over the past decade and are much more than mere formalities, as may be the case in other services. If an officer with a Reserve commission is extended and is subsequently selected for promotion to Major, then he is automatically "augmented" and receives a Regular commission as a Major. The choices available to an officer with a Reserve commission closely resemble those available for an enlisted member.

Because of successive and specific reenlistment periods, the points where individual enlisted members make their decisions can therefore be tracked with some accuracy. For officers, the individual's decision points can occur at any time following his EOS.

Several studies have investigated the factors involved in the individual's decision to remain in the service. Most of these studies have concentrated on the enlisted member's decision process because of the ease in tracking these decision points and because of the need to retain such large numbers of enlisted members since the inception of the All Volunteer Force (AVF). Although the decision process for enlisted members is different from the decision process for officers, some of the results from

these studies can still be used to guide future research and to provide a basis for additional studies.

B. TURNOVER THEORY

To explain voluntary turnover, research on civilian turnover theory has analyzed the decision process an *individual* goes through prior to actually quitting. This decision process covers many variables, including economic ones, but economic variables alone do not explain the entire process. Other variables involved in this process are organizational commitment, job satisfaction, and behavioral intentions. Turnover theory incorporates individuals' perceptions and their evaluation of available alternatives. [Ref. 2:p. 12]

Muchinsky (1987) refers to a 1977 study by R. M. Steers and defines organizational commitment as "the relative strength of an individual's identification with the involvement in a particular organization." Muchinsky also adds that

> it is characterized by (1) strong belief in and acceptance of the organization's goals and values; (2) willingness to exert effort for the organization; and (3) desire to maintain membership in the organization.

According to Muchinsky, Steers proposed three sets of antecedents for organizational commitment. They are personal characteristics, job characteristics, and work experiences. Personal characteristics include age and education. Job characteristics involve challenge, opportunities for social interaction, and the amount of feedback provided on the job. Work experiences include attitudes towards the organization, organization

dependability, and the realization of expectations within the organization [Ref. 3:pp. 382-383].

"Job satisfaction is the extent to which a person derives pleasure from a job. Like any feelings of satisfaction, job satisfaction is an emotional response." [Ref. 3:p. 396] If an individual is satisfied with his job, it is more likely that he or she will want to continue in that job. There are two main factors involved in an individual's decision not to continue in his or her job: the availability of other jobs and how happy the individual is with his or her current job. [Ref. 4:p. 175]

People can feel differently about various aspects of their job. Psychologists began examining these aspects and their relationship with an individual's overall satisfaction with his job. This examination involves measuring how people feel about the various aspects of their jobs. A statistical approach to measuring these attitudes involves conducting surveys of employees' attitudes concerning separate aspects of their jobs. These responses are correlated and factors are identified based on similar responses. [Ref. 3:p. 397]

According to Muchinsky (1987), the most widely accepted view of job satisfaction assumes that each person has in mind some standard of what is to be expected from a particular job. The individual compares that standard with his own perception of how closely the job meets that standard or his expectations. The degree of individual job satisfaction results from the difference between the individual's standard or expectations and what is actually received from the job. [Ref. 3:p. 399]

This standard must be defined. Some researchers believe it comes from personal needs, either physical or psychological. Other researchers believe the standard evolves from personal values rather than needs. These values are related to what a person desires or seeks to attain. Values determine people's choices and their responses to those choices. Different people have different values, so they will also differ in their attitude towards job satisfaction.

Herzberg's research focused on improving worker productivity by improving worker satisfaction [Ref. 5:p. 21]. His theory was that some factors were associated with high satisfaction and others with dissatisfaction. Factors involving job content were classified as "satisfiers" and those involving job context were classified as "dissatisfiers."

Satisfiers must be present in a job in order for an individual to experience job satisfaction. When satisfiers are absent from a job, the person will not feel dissatisfied but will be neutral or indifferent. Achievement, advancement, recognition, and responsibility are examples of satisfiers. Examples of dissatisfiers are policies, supervision, salary, and working conditions.

If job context factors, or dissatisfiers, are not met adequately within a job, the worker will be dissatisfied. If they are met adequately, the worker will feel neutral or indifferent. So job satisfaction cannot be achieved by meeting only the dissatisfiers, these will just ensure that the worker is not *dis*satisfied. In short, Herzberg's theory implies that satisfaction is derived from conditions of work [Ref. 3:p. 402].

Victor Vroom (1964) proposed that a combination of work role variables and individual personality variables affects the degree of individual job satisfaction. Job satisfaction was described as a function of an individual's characteristics and the nature of the job he performed [Ref. 5:pp. 22-23].

Steers and Porter proposed a model of "Facet Satisfaction." They indicated that satisfaction was a function of individual characteristics and job characteristics. Hopkins (1983) proposed models which combined job characteristics and job environment as determinants of job satisfaction. [Ref. 5:pp. 24-25]

Another theory looked at turnover as a function of job satisfaction. It proposed that turnover had a negative relationship with job satisfaction. As job satisfaction decreased, turnover would increase. [Ref. 5:p. 30]

From their study in 1980, Szilagy and Wallace formulated a scale containing five factors commonly associated with job satisfaction: the work itself, pay, promotion, supervision, and co-workers [Ref. 6:p. 16].

Arnold and Feldman (1982) surveyed members of the accounting profession to develop and test a working model of actual turnover behavior. They concluded that turnover is significantly influenced by age, tenure in the organization, overall job satisfaction, organizational commitment, perceived job security, and intention to search for an alternative position. Their revised model treats turnover as a function of tenure, intention to search for alternatives, and perceived job security. [Ref. 7:pp. 350, 359]

Cotton and Tuttle (1986) reviewed several studies of employee turnover. They provided a listing of factors which correlate with turnover and are separated into three categories: external correlates, work-related correlates, and personal correlates. They concluded that age, tenure, overall job satisfaction, employment perceptions, and many other variables were found to be stable and reliable correlates with turnover. Factors such as task repetitiveness, accession rate, and intelligence were found to be weakly, if at all, related to turnover. [Ref. 8:pp. 57–58, 63]

Lee and Mowday (1987) surveyed employees of a financial institution and obtained information on respondents' job performance through access to their personnel records. They concluded that job performance, met expectations, job values, organizational characteristics, and organizational experiences explained a significant portion of the variance in responses. They also concluded that job satisfaction, organizational commitment, and job involvement explained a significant proportion of the variance in intention to leave. [Ref. 9:pp. 721, 735-736]

In summary, studies over the years have identified or theorized that the following factors affect individual job satisfaction (which in turn affect turnover): working conditions, individual characteristics, worker/employer expectations, co-worker relationships, and alternative job opportunities. [Ref. 5:p. 34]

C. MILITARY TURNOVER RESEARCH

Employee turnover is a necessary and natural aspect of the day-to-day operations of any organization. Excessive turnover can, however, lead to personnel shortages in critical positions, increase the cost to

recruit and train replacement personnel, lower worker productivity, and ultimately affect the effectiveness of the unit or organization. If the factors affecting turnover can be measured and predicted, policy makers within the organization will be better able to manage the impact and minimize the negative effects of turnover on the entire organization. Ashcraft (1987) noticed that an increasing amount of research had been devoted towards the study of employee turnover and that the majority of the effort focused on identifying and measuring those factors which predict individual turnover behavior. [Ref. 10:p. 17]

Doering and Grissmer (1985) concluded that consistent or definitive survey information was not available to investigate the differences between the various factors which "push" an individual out of the military versus those that "pull" an individual into civilian life. Their ideal survey for this purpose would be one that collected data at specific reenlistment or separation points and included follow-up studies as individuals stay in the service or resume civilian careers. They also concluded that the most effective approach is to survey individuals about their intentions at various times before their actual decision. [Ref. 1:p. 32]

Several studies have investigated the turnover behavior of officers. Fitzgerald (1964) approached the problem of junior officer retention in the U.S. Navy using utility theory and decision theory in the context of operations analysis to arrive at an ordered listing of the reasons for turnover. [Ref. 11:p. ii]

Lopez (1973) examined the pertinent aspects of retention of U.S. Navy Surface Warfare junior officers by surveying 162 of these officers

who were attending the Naval Postgraduate School. His questionnaire covered the following areas: effect of supervisors, compensation, promotion, minority affairs, transfer (deployments, time away from home), fringe benefits, education and training, living accommodations, proposed legislation, external influences, Navy standards, ships and equipment, command at sea, and image.

He concluded that sea pay was an incentive for retention and should remain part of the pay and allowance package. He recommended: minimum four-year tour lengths for CONUS assignments, mandatory retirement of senior officers (over 20 years of service) who fail selection to the next rank more than once, postgraduate education for all qualified officers, review of DOD retirement policies, continuation of equipment upgrades, maintenance of opportunities for command at sea, and a concerted effort to enhance the image of the Surface Navy. [Ref. 12:pp. 2-3]

Cook (1979) tried to predict Naval Aviator retention six to 18 months in the future using the Navy's Human Resources Management Survey. He found that stated career intention appeared to be a sound predictor of actual retention behavior and that attitude measures, command climate, and general satisfaction were highly correlated with personnel retention. He recommended that similar efforts be used to forecast unit-level retention. [Ref. 13:pp. 4, 45]

Schmidt (1982) analyzed the career orientation of junior U.S. Navy officers using data from a 1978 Rand Corporation survey. He concentrated on officers with more than two but less than 10 years of service. He found that the most important factor was the individual's overall

satisfaction with Navy life. The individual's general feelings towards his job and organization were next in importance. A variable labelled "met expectations" also had a major influence on career orientation. He found that age, education, and family size were positively correlated with career orientation.

Factors which Schmidt found to have negative influences were feelings that military pay and benefits would not keep up with inflation and the expectation of future declines in retirement benefits. Another factor with a negative influence was spouse's civilian earnings. An interesting finding was that, on average, the spouse's income represented 16 percent of the total family income. The influence of source of commission varied depending on length of service [Ref. 14:pp. 4, 42, 100, 104, 105].

Ashcraft (1987) constructed and tested a model of the career orientation for junior unrestricted line naval officers. He used responses from the *1985 DOD Survey of Officer and Enlisted Personnel.* His findings showed that the factors which influenced junior officers most strongly were: the amount of time on sea duty, the perceived probability of finding a good civilian job, and satisfaction with extrinsic job factors. The extrinsic job factors included: pay and allowances, current military job, job training or in-service education, and working or environmental conditions. Important factors in predicting whether officers will stay for 20 years or more included all of the previously mentioned factors plus warfare specialty and satisfaction with family-related factors. The family-related factors included: assignment stability, family environment, PCS moves, job security, and medical care. [Ref. 10:pp. 4, 32-33, 74-75]

Cain, Lensing, and Menifee studied the behavior of officers in the medical fields. Cain (1982) studied the factors influencing the career decisions of medical officers within the Military Health Services System (MHSS) using information derived from the 1978 Rand survey of officers and enlisted personnel. He found that most medical officers were dissatisfied with the frequency of permanent change of station (PCS) orders and also dissatisfied with their military salary and benefits compared to those of civilian medical professionals. He also found that financial incentives and several job components were important variables affecting career decisions of military physicians [Ref. 15:pp. 4, 18].

Lensing (1984) investigated whether the perception of alternative job factors affected the career orientation of military Nurse Corps officers in both their initial and subsequent periods of service obligation. She used the results of the *1978 DOD Survey of Officers and Enlisted Personnel*. She concluded that the relative importance of various job attributes changes depending on the stage within the career of a military nurse. These changes are most evident within the initial period of obligated service. Autonomy, characterized as "having a say in what happens to me," was found to be an important determinant. She also found that training opportunities were important for those in subsequent periods of service obligation and that salary was not a significant factor in regard to turnover within the Nurse Corps. [Ref. 16:pp. 4, 40-41, 83-85]

Menifee (1984) also used the 1978 DOD survey to examine the determinants of organizational commitment for military physicians. Organizational commitment was measured in terms of the physician's intended

years of service beyond his obligated service requirement. He concentrated his study on physicians with less than 10 years of service and on those physicians who were not within their initial period of obligated service. He found that civilian versus military wage comparisons, attitudes toward the immediate supervisor, and civilian versus military retirement benefits comparisons were important factors in retaining these physicians. [Ref. 17:pp. 4, 12, 76-79]

Many studies have investigated enlisted member turnover behavior. Siggerud (1981) investigated social, environmental, and economic factors that influence the enlistee's decision to reenlist or to leave the U. S. Navy using the *1978 DOD Survey of Officer and Enlisted Personnel.* His research suggested that the most important factors affecting the individual's intention to reenlist were: military pay versus civilian pay opportunities, duty station, and family considerations. One recommendation that was quite interesting was to eliminate the contract system (successive reenlistment contracts) after the first four years of service. He suggests that the savings from reenlistment bonus payments could be used to restructure the military pay scale [Ref. 18:pp. 4, 12].

Kreutner (1982) examined the behavior of non-prior-service enlisted reservists. He used historical data from DMDC and the 1978 Rand Corporation survey. He found that as age increased, performance also increased. Performance was evaluated using scores on the Armed Forces Qualification Test (AFQT). He also noticed that the cohort of reservists who entered the service at the age of 22 to 24 had the lowest attrition rate over the first term of service. He recommended that the services

should recruit more individuals from this age group. [Ref. 19:pp. 114, 115, 119, 120]

Orvis (1982) investigated the relationship between survey enlistment intention measures and respondents' subsequent enlistment decisions. He used two databases. One was the results of the 1981 Applicant Survey and the other consisted of 10 Youth Attitude Tracking Surveys (YATS) from Spring 1976 to Fall 1980. One interesting finding was that the power of YATS intention measures appears to be greatest within the first 12 to 18 months following the survey. However, these measures continue to distinguish different enlistment rates for up to three to four years after completing the survey [Ref. 20:pp. iii, v, 6, 44]. This study showed that there is value in using survey results to predict individual behavior several years beyond the survey date.

Christensen (1983) examined reenlistment intentions of first-term Navy enlisted personnel who were within one year of expiration of active obligated service (EAOS). The data were taken from the *1978 DOD Survey of Officers and Enlisted Personnel.* She found that the two most significant factors were: (1) the perception that the family would be better off with the respondent in a civilian job, and (2) satisfaction with military life. Another important factor was special pay and allowances or bonuses. Her recommendations included the continuance of special pays such as sea pay and reenlistment bonuses, and she urged policy makers to maintain military pay equity with pay in the civilian market [Ref. 21:pp. 4, 42, 81–83].

O'Donohue (1988) examined the factors which influence a male, first-term enlisted reservist's decision to remain in the Selected Marine Corps Reserve (SMCR). His data came from a combination of the responses of participants in the *1986 Reserve Component Surveys* and their personnel records from the Reserve Components Common Personnel Data System. He found that reserve income has a statistically significant and positive impact on SMCR retention and that educational benefits, civilian job-related training, and retirement benefits all were significant factors in retaining prior-service reservists. [Ref. 2:p. iv]

The theses of Schmidt and Ashcraft provided updated models of turnover behavior based on previous research and theory. These studies formed the theoretical basis for this thesis. Some of the factors found to be significant in their studies were considered in this thesis, while other factors (such as sea pay and family financial resources) were not included Unlike the theses of Schmidt and Ashcraft, this thesis utilizes information on actual retention rather than self-reported retention intentions.

III. METHODOLOGY AND DATA DESCRIPTION

A. METHODOLOGY

This thesis followed similar methodology to that used by both Schmidt (1982) and Ashcraft (1987) to study retention intention. The data used in Ashcraft's thesis also came from the *1985 DOD Survey of Officer and Enlisted Personnel.* Schmidt and Ashcraft both concentrated on junior naval officers and the factors which influence their career orientation. Figure 1 depicts the hypothesized model for this thesis. Figure 2 depicts the conceptual model used by Schmidt and Figure 3 depicts that used by Ashcraft.

Some of the biographic and demographic factors used by Schmidt and Ashcraft in their models involved individual information on age, marital status, number of dependents, occupational specialty, commissioning source, and years of education. Their time/tenure-related factors measured characteristics such as length of service, pay grade, amount of

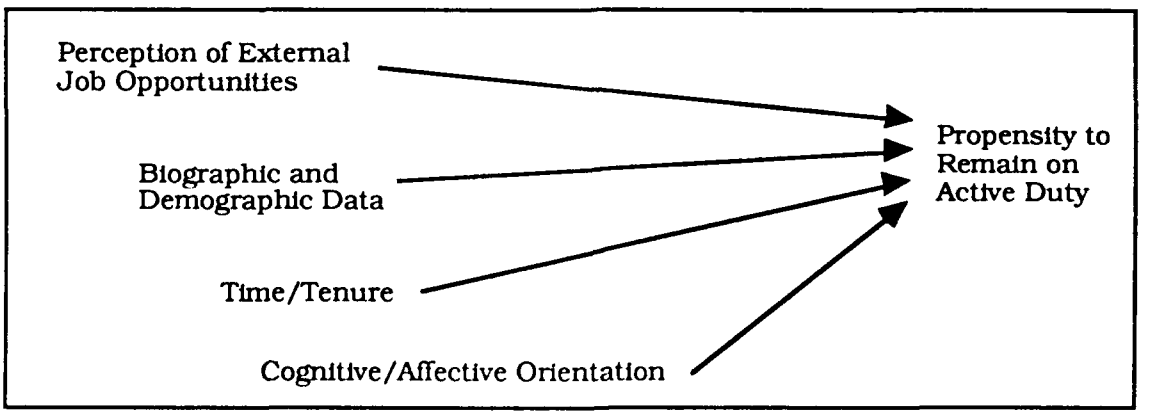

Figure 1. **The Hypothesized Model**

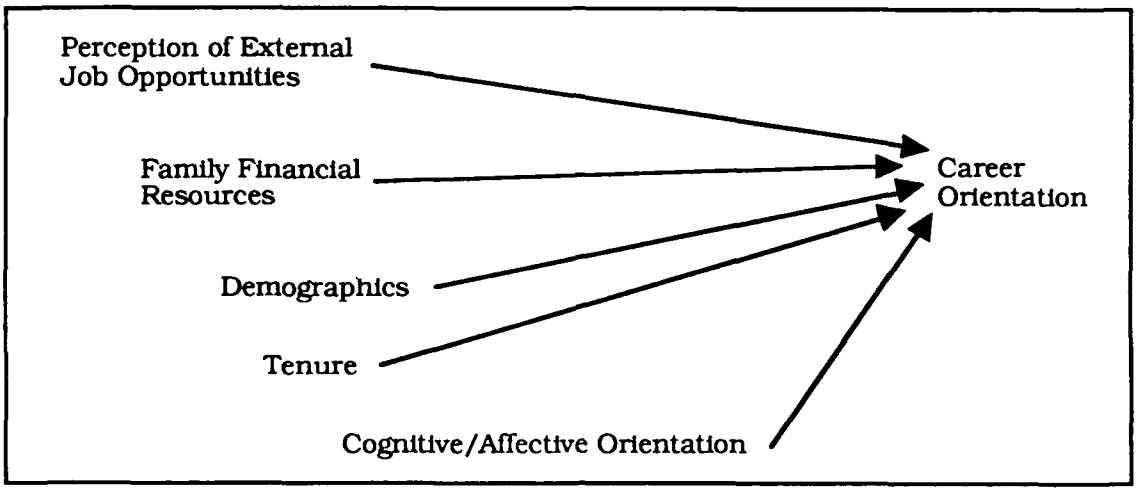

Figure 2. **The Schmidt (1982) Model**

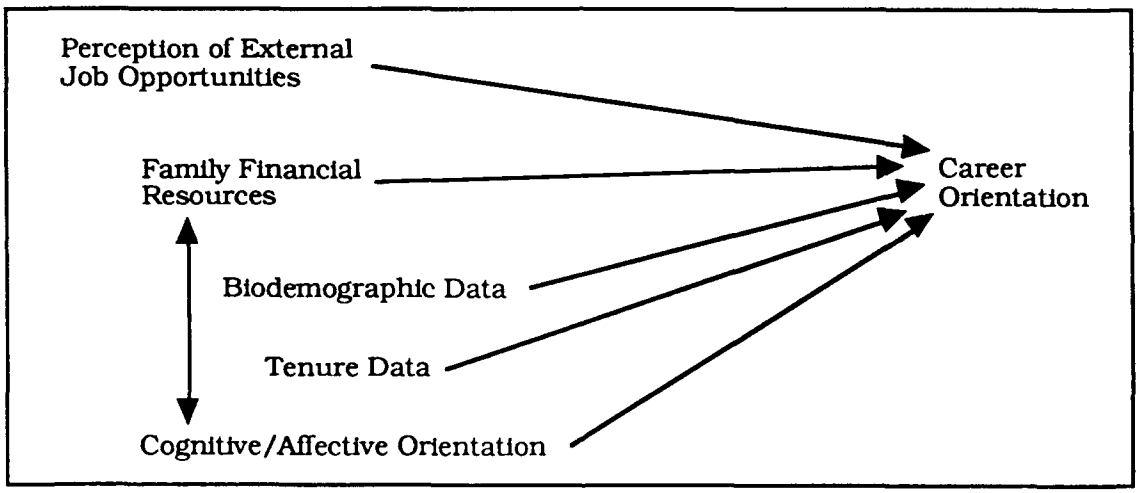

Figure 3. **The Ashcraft (1987) Model**

obligated service remaining, time separated from dependents, and number of months of sea duty. Cognitive/affective factors dealt with the individual's perception of, and satisfaction with, different aspects of the job and family concerns. Family financial resources covered total family income and the spouse's contribution to the total income. [Ref. 10:pp. 30, 46–47; Ref. 14:pp. 52–53]

Ashcraft found that the family financial resource variables were not statistically significant and he dropped them from his final model. More than half of the officers contained in the sample for this current thesis were single, so their total family income would, in most cases, consist of military pay only. The amount of military pay depends entirely on pay grade and time in service. If military pay were retained as a variable in this model, it would be expected to be collinear with some of the time/ tenure variables. In addition, spouse's income is a variable over which policy makers have very little control and the results for this variable would not be very informative. For these reasons and because the self-reporting of income characteristics was sometimes incomplete, family financial resource variables were not included in the hypothesized model for this thesis (see Figure 1).

Some of the biographic and demographic variables used by Schmidt and Ashcraft were collinear with some of the time/tenure variables (i.e., age and pay grade with length of service) and they were excluded from the hypothesized model for this current thesis. There were a few variables, such as sea pay, which were significant in Ashcraft's model for naval officers but did not apply to this study of Marine officers.

Ashcraft measured career orientation by evaluating the survey question, "When you leave the military, how many total years of service do you expect to have?" He placed the respondents into two categories: careerist and non-careerist. Each of these categories was further subdivided into two time frames: short term and long term [Ref.10:pp. 32-33]. The basis for these categories came from self-reported intentions. The

measure of career orientation in this thesis was based on actual retention behavior instead of relying on self-reported intention data. Actual retention behavior was based on the 1989 military status of the respondents to the 1985 survey.

B. DATA DESCRIPTION

The data used in this thesis came from two sources: (1) responses to the *1985 DOD Survey of Officer and Enlisted Personnel* and (2) information on each respondent's 1989 military status from data maintained by the Defense Manpower Data Center (DMDC). Previous studies used self-reported information on career or retention intentions. An individual's self-reported intentions are not always in consonance with his actual retention behavior. This study uses actual retention behavior information instead of self-reported intentions.

The basic stratification for the 1985 DOD survey was by officer/enlisted status and service. Officers, females, and Marine Corps personnel were sampled at a higher rate in order to permit more detailed analyses of these groups [Ref. 24:p. 2-2]. Table 3.1 depicts the survey stratification for officers, broken down by service and sex.

The final sample sizes were based on a compromise by DMDC between the number of questionnaires needed for detailed analyses of special populations and budgetary constraints. The officer population from which the 1985 survey was drawn consisted of active-duty officers who were stationed in the United States (CONUS) or overseas on 30 September 1984. Some officers were discharged between the time the

TABLE 3.1

SAMPLE INFORMATION BY STRATIFICATION CELL

Sex	Army	Navy	Marine Corps	Air Force	DOD
Male	5,868	3,736	3,940	5,668	19,212
Female	2,044	1,310	628	2,238	6,220
Total	7,912	5,046	4,568	7,906	25,432

samples were selected and the date the survey was actually administered, so a reduced number remain as "eligible members" [Ref. 24:p. 2-5]. Table 3.2 depicts the sample allocation and response rates of Marine Corps officers.

TABLE 3.2

SAMPLE ALLOCATION AND RESPONSE RATES OF MARINE CORPS OFFICERS

Sex	Sample Members	Eligible Members	Usable Questionnaires Returned	Returned as a Percent of Eligibles
Male	3,940	3,843	3,170	82.5
Female	628	601	514	85.5
Total	4,568	4,444	3,684	82.9

The sample used in this study was narrowed even further. Women Marines are not present in all of the military occupational specialties (MOS). Some of the MOS groupings in this study, particularly the Combat Arms and Aviator groupings, have few, if any, females in them. Therefore, retention behavior of women Marine officers was not studied.

Only company-grade officers (pay grades O-1, O-2, and O-3) were selected for this study. These officers represent the majority of officers who would be within their initial period of obligated service. Many Warrant Officers and all Majors (O-4) and above have already completed their initial obligation. The term "initial obligation" represents the contractual period of service required by a particular commissioning program plus any further obligation incurred due to some form of follow-on training (such as flight school). Question 08 of the survey asked, "Are you presently serving within your INITIAL SERVICE OBLIGATION as a commissioned officer?" An officer with an affirmative response was retained as part of this study's sample.

The initial service obligation varies from a minimum of three years for OCS graduates to a maximum of seven and a half years for some pilots and naval flight officers. This study looked at only those officers with more than 12 months and no more than seven and a half years of total service. The survey question on length of service (06E6) included prior enlisted time, so total service includes both enlisted and commissioned service.

The Matched Member File indicated the respondents' status as of 1989. To ensure that all members of this study's sample had an opportunity to complete their initial obligation before 1989, only those officers were retained in the sample who had less than three years remaining in their obligation at the time of the survey. The survey question 09 addressed this issue.

Lawyers (MOS 4401 and 4402) were deleted from this sample because they did not represent "typical" commissioning sources or have "typical" career paths. Officers without an assigned specialty (MOS 9901) were also deleted. These officers either have not completed training or are considered not to have had sufficient time in an operational environment to make informed career decisions.

The total number of officers who remained in this study's sample was 456. This represents 12.4 percent of the 1985 DOD Marine Corps officer sample who returned usable questionnaires.

IV. ANALYSIS

A. VARIABLE SELECTION AND MODEL SPECIFICATION

Retention, for the purposes of this study, is defined as an officer's decision to remain on active duty beyond his initial obligated service requirement. The alternative choice is to leave active duty. The retention decision is thus a binary one and can be evaluated as a dichotomous dependent variable. The dependent variable for this study was taken from the Matched Member File of the *1985 DOD Officer and Enlisted Personnel Survey*. If the respondent was still on active duty in 1989, he was considered a "stayer" and the variable ACT89 was coded as "1"; otherwise, he was considered a "leaver" and ACT89 was coded as "0." Table 4.1 depicts the frequency distribution of the dependent variable ACT89.

TABLE 4.1

DEPENDENT VARIABLE FREQUENCY DISTRIBUTION

	Number	**Percent**
Stayers (ACT89 = 1)	240	52.6
Leavers (ACT89 = 0)	216	47.4
Total	456	100.0

This study utilized logistic regression to analyze the turnover decision.

The logit regression model best suits a binary dependent variable due to the asymptotic characteristics of the logistic function. The

logit model is based upon the cumulative logistic distribution which restricts the dependent variable from zero to one." [Ref. 22:p. 42]

The value of the dependent variable was interpreted as the probability of an individual remaining on active duty (AD). The model is specified as follows:

$$P(\text{remain on AD}) = \frac{1}{1+e^{-(B_0X_0+B_1X_1+B_2X_2+B_3X_3+\ldots B_kX_k)}}$$

where P is the probability that an individual remains on active duty and e is the base of the natural logarithm. The X_i are the values of the explanatory variables, the B_i are the values for the estimated parameters of the model, and k denotes the number of explanatory variables measured for each individual.

The candidate biographic and demographic variables included marital status, commissioning source, military occupational specialty (MOS), age at entry, race, and housing. Table 4.2 presents the frequency distribution of the dichotomous explanatory variables. The variable years of service (YOS) had a mean value of 3.5 with a standard deviation of 1.5 and minimum and maximum values of 1.0 and 7.5, respectively. The variable years at present location (YPRESLOC) had a mean value of 1.4 with a standard deviation of 0.9 and minimum and maximum values of 0.0 and 5.1, respectively. Table 4.3 presents cross-tabulations between the dichotomous explanatory variables and the dependent variable (ACT89).

TABLE 4.2

CANDIDATE EXPLANATORY VARIABLES (N = 456]

Variable	Number	Percent
FAMILY STATUS		
SINGLE (SINGLE)	196	43.0
MARRIED-NO-CHILDREN (MNC)	142	31.1
MARRIED-WITH-CHILDREN (MWC)	109	23.9
OCCUPATIONAL SPECIALTY		
COMBAT ARMS (COMBARMS)	141	30.9
COMBAT SUPPORT (COMBSUPP)	130	28.5
PILOTS & NFO'S (AVIATOR)	153	33.6
AVIATION SUPPORT (AVSUPP)	32	7.0
AGE AT ENTRY		
BEFORE 21 (EARLY)	29	6.4
BETWEEN 21 AND 24 (NORM)	362	79.4
AFTER 24 (LATE)	65	14.3
COMMISSIONING SOURCE		
SERVICE ACADEMY (ACADEMY)	36	7.9
PLATOON LEADERS CLASS (PLC)	169	37.1
OCS OR OTHER (OCSOTH)	162	35.5
RESERVE OFFICER TRAINING CORPS (ROTC)	83	18.2
RACE		
MINORITY (MINORITY)	31	6.8
HOUSING		
GOVERNMENT (GOVT)	129	28.3
PERCEPTION OF JOB OPPORTUNITIES		
GOOD	405	88.8
TIME/TENURE		
YEARS OF SERVICE (YOS)	MEAN = 3.5	
YEARS AT PRESENT LOCATION(YPRESLOC)	MEAN = 1.4	

TABLE 4.3

RETENTION BEHAVIOR BY CANDIDATE EXPLANATORY VARIABLES

Variable	Number of "Stayers"	"Stayer" Percentage
FAMILY STATUS		
SINGLE (SINGLE)	87	44.4
MARRIED-NO-CHILDREN (MNC)	75	52.8
MARRIED-WITH-CHILDREN (MWC)	72	66.1
OCCUPATIONAL SPECIALTY		
COMBAT ARMS (COMBARMS)	83	58.9
COMBAT SUPPORT (COMBSUPP)	54	41.5
PILOTS & NFO'S (AVIATOR)	88	57.5
AVIATION SUPPORT (AVSUPP)	15	51.7
AGE AT ENTRY		
BEFORE 21 (EARLY)	15	51.7
BETWEEN 21 AND 24 (NORM)	192	53.0
AFTER 24 (LATE)	33	50.8
COMMISSIONING SOURCE		
SERVICE ACADEMY (ACADEMY)	22	61.1
PLATOON LEADERS CLASS (PLC)	85	50.3
OCS OR OTHER (OCSOTH)	71	43.8
RESERVE OFFICER TRAINING CORPS (ROTC)	58	69.9
RACE		
MINORITY (MINORITY)	17	54.8
HOUSING		
GOVERNMENT (GOVT)	67	51.9
PERCEPTION OF JOB OPPORTUNITIES		
GOOD	211	52.1
TOTAL "STAYERS"	**240**	**52.6**

The variables SINGLE, MNC, and MWC were dichotomous variables created from the survey questions on marital status (O51E48) and number of dependents (O67E64). The question on number of dependents did not include the spouse. A respondent was considered as single if he answered question O51E48 as widowed, divorced, or never married. A respondent was considered as married-with-children (MWC) if: (1) he answered the question as married (first time), remarried, or separated. **and** (2) if question O67E64 was answered as any value greater than zero.

Originally, SINGLE was also broken down into single-no-children and single-with-children, but there were not enough responses of single-with-children to provide adequate dispersion for the logit regression model, so the two were combined. It was expected that married officers would remain on active duty at a higher rate than single officers and that married officers with children would remain on active duty at an even higher rate. The basis for this hypothesis was that the opportunity costs associated with leaving active duty and finding a job are greater for married service members than for single ones.

The variables ACADEMY, PLC, ROTC, and OCSOTH were dichotomous variables created from the survey question on commissioning source (O10). ACADEMY represents graduates from the service academies, PLC represents officers commissioned through Platoon Leaders Course, ROTC represents officers commissioned through the Reserve Officer Training Course (both regular and scholarship), and OCSOTH represents those officers commissioned through Officer Candidate School or other commissioning sources not already mentioned.

Officers commissioned through the service academies and the ROTC (scholarship) program receive regular commissions upon graduation and are not required to appear before Augmentation Boards and compete to remain on active duty. It was expected that officers from these commissioning sources would remain on active duty at a higher rate than officers commissioned through other sources.

The variables COMBARMS, COMBSUPP, AVIATOR, and AVSUPP were dichotomous variables created from the active service occupation information taken from the 8503 Master File. These variables represent MOS groupings. COMBARMS included officers from the infantry (03XX), the artillery (08XX), and tanks and amphibian vehicles (18XX). COMBSUPP included officers from personnel and administration (01XX), intelligence (02XX), logistics (04XX), engineers (13XX), operational communications (25XX), signals intelligence/ground electronic warfare (26XX), supply administration and operations (30XX), auditing, finance and accounting (34XX), motor transport (35XX), data systems (40XX), public affairs (43XX), and military police and corrections (58XX). AVIATOR included pilots and naval flight officers (NFO). AVSUPP included officers from aircraft maintenance (60XX), air control/air support/anti-air warfare (72XX), and air traffic control (73XX). It was expected that officers from combat support and pilot MOS groupings would remain on active duty at lower rates than combat arms groupings due, in part, to the relative ease of skill transfer from the military to the private sector.

Age at entry was calculated by dividing length of service (O6E6) by 12 to obtain years of service and then subtracting years of service from

current age (O36E35). Age at entry was an approximation and may be misleading in a few cases because length of service also includes prior enlisted time. The size of the possible error depends on the number of years between the officer's age when he left the service as an enlisted member and his age when he came on active duty as an officer. EARLY represents age at entry prior to age 21. NORM represents age at entry between 21 and 24. LATE represents age at entry after age 24. It was expected that officers who entered service at a later age would remain on active duty at a higher rate than those who entered at an earlier age. It was believed that officers who join the service at a later age have more maturity and have made a more in-depth analysis of the costs and benefits of their decision to enter the service. It would then be more probable that military service would meet the expectations of older officers than those of younger ones.

The variable MINORITY was a dichotomous variable created from the survey question on race (O39E38). If the answer to this question was anything other than white/Caucasian, then MINORITY was coded as "1"; otherwise, it was coded as "0." Because of the limited number of responses from minority officers, a further breakdown of minorities was not possible.

> Minorities have traditionally experienced higher unemployment rates then whites, leaving fewer employment alternatives for minorities. Previous studies have concluded that minorities are more likely to be retained than whites. [Ref. 22:p. 45]

The variable GOVT was a dichotomous variable created from the survey question on present housing (O19E18). If the question was

answered as "base/government housing" then GOVT was coded as "1"; otherwise, it was coded as "0."

There were two time/tenure variables considered in this model. One was YOS, which represents years of service and was created from the length-of-service question (O6E6). Length of service was reported in months and included prior enlisted time. O6E6 was converted to years by dividing it by 12. It was expected that as an officer accrues more years of service he would remain on active duty at a higher rate. It was believed that officers with more years of service have more time "invested" in the service and may continue to serve in order to qualify for retirement benefits. In addition, the longer an officer stays in service, the less likely it will be that he will retain marketable skills learned in college. Unless his military specialty has some transferability of skills to the civilian sector, the costs of leaving the service may be high due to the amount of time spent in the civilian job search process.

The other time/tenure variable included was YPRESLOC, which represents years at present location and was created from the number of months at present location question (O13E12), which was converted to years. There was no *a priori* expectation for this variable. Years at present location could serve as a proxy for satisfaction with current location. The longer an officer stays in a particular place, the more he may be satisfied with that duty station. On the other hand, officers are moved every three to five years as a matter of policy. Some officers like the challenges offered by change and would be less satisfied the longer they stay in one place.

The dichotomous variable GOOD was created from the survey question about perception of job opportunities (O96E92). This variable attempted to capture the individual officer's perception of his job opportunities in the private sector. The answers to this question ranged from "no chance" (coded as 1) to "certain" (coded as 11). If this question was answered as "good" or better, then GOOD was also coded as "1"; otherwise it was coded as "0." It was expected that officers who feel that they have good private-sector job opportunities will be less likely to remain on active duty. They may be more likely to inquire about those opportunities and actually accomplish some job searching.

The remaining explanatory variables in the model were cognitive/affective orientation variables. "The perceptions of the officer and his family regarding cognitive/affective job factors will heavily influence the career decision...." These variables are "...designed to assess the perception of, and degree of satisfaction with intrinsic and extrinsic aspects of the military job, and family-related factors." [Ref. 10:pp. 49–53] Intrinsic variables indicate how satisfied the respondent was with the characteristics or aspects of military life. Some of these variables are difficult to quantify and are arbitrary in nature. Extrinsic variables address the more tangible aspects of military jobs, such as pay and allowances, post-service education benefits, and commissary privileges.

Factor analysis was used to identify dimensions among these cognitive/affective variables, which included: intrinsic job satisfaction, extrinsic job satisfaction, satisfaction with health/retirement benefits, satisfaction with current location, and satisfaction with community attitudes.

These original cognitive/affective variables had responses ranging from "very dissatisfied" (1) to "very satisfied" (5) or "serious problem" (1) to "not a problem" (5). Responses of "not answered," "don't know," or "not applicable" were assigned the mean value for that question [Ref. 23:p. 744]. Table 4.4 shows which questions were affected and the frequency of mean substitution for each question.

TABLE 4.4

VARIABLES ASSIGNED MEAN VALUES FOR MISSING RESPONSES

Question	Frequency
WORK CONDITIONS	3
CLIMATE	2
DISTANCE	11
RECREATION	6
ATTITUDES OF LOCALS	24
CRIME	27
RACIAL TENSION	48
JOB SECURITY	4
DENTAL CARE	1
COMMISSARY SERVICES	1
RETIREMENT	2
VEAP BENEFITS	2

The SAS procedure "PROC FACTOR" was used on the 21 cognitive/affective orientation variables to create the five separate factors. Factor analysis allows us

> to see whether an underlying pattern of relationships exists, such that the data may be rearranged or reduced to a smaller set of common factors or components that may be taken as source

variables accounting for the observed interrelations in the data. [Ref. 10:p. 50]

The Kaiser measure of sampling adequacy was 0.769. Samples scoring above 0.5 are usually suitable for factor analysis [Ref. 23:p. 356]. The table in the appendix presents a complete listing of these variables and the individual factor loadings for each factor.

Table 4.5 lists the intrinsic job satisfaction variables. These variables consisted of responses to survey questions which measured individual satisfaction with inherent aspects of the job and personal relationships. The variable for co-workers loaded most heavily on FACTOR1 but also made a strong contribution to FACTOR2, as can be seen in the table in the appendix. It was expected that the more an officer was satisfied with this component, the more likely it would be that he would remain on active duty.

TABLE 4.5

INTRINSIC JOB SATISFACTION FACTOR COMPONENTS

Factor Name	**Variables**	**Questionnaire Item**
FACTOR1	CO-WORKERS	O109105C
	HAPPY WITH JOB	O109105J
	FRIENDSHIPS	O109105B
	WORK CONDITIONS	O109105N
	PERSONAL FREEDOM	O109105A
	SERVE COUNTRY	O109105I

Table 4.6 lists the extrinsic job satisfaction variables. These variables consisted of responses to survey questions which measured individual satisfaction with specific aspects of the job, including some

monetary benefits. The variable for pay and allowances loaded most heavily on FACTOR2 but was almost as closely associated with FACTOR1 and FACTOR3, as can be seen in the table in the appendix. It was expected that the more an officer was satisfied with this component the more likely it would be that he would remain on active duty.

TABLE 4.6

EXTRINSIC JOB SATISFACTION FACTOR COMPONENTS

Factor Name	Variables	Questionnaire Item
FACTOR2	PROMOTIONS	O109105K
	JOB SECURITY	O109105M
	JOB TRAINING	O109105L
	VEAP BENEFITS	O109105O
	COMMISSARY SERVICES	O109105R
	PAY	O109105E

Table 4.7 lists the satisfaction with health/retirement benefits variables. These variables consisted of responses to survey questions which measured individual satisfaction with health-care benefits (both medical and dental) and retirement benefits. The variable for retirement benefits loaded most heavily on FACTOR3 but was also closely associated with FACTOR1 and FACTOR2, as again can be seen in the table in the appendix. It was expected that the more an officer was satisfied with this component, the more likely it would be that he would remain on active duty.

Table 4.8 lists the satisfaction with current location variables. These variables consisted of responses to survey questions which measured

TABLE 4.7

SATISFACTION WITH HEALTH/ RETIREMENT BENEFITS FACTOR COMPONENTS

Factor Name	Variables	Questionnaire Item
FACTOR3	MEDICAL CARE	O109105P
	DENTAL CARE	O109105Q
	RETIREMENT	O109105H

TABLE 4.8

SATISFACTION WITH CURRENT LOCATION FACTOR COMPONENTS

Factor Name	Variables	Questionnaire Item
FACTOR4	DISTANCE	O20E19B
	CLIMATE	O20E19A
	RECREATION	O20E19H

individual satisfaction with specific aspects of the individual officer's present duty station. These included climate, distance to population centers, and available recreational facilities. It was expected that this component would have a negative effect on retention. An officer who was satisfied with his current location might want to stay in that location. Due to the change of duty station policies, the only way to stay at the location would be to leave the service. Likewise, an officer who is dissatisfied may request to be moved at an earlier date than anticipated.

Table 4.9 lists the satisfaction with community attitudes variables. These variables measured the individual officer's perception of local com-

munity attitudes and problems. They include attitudes of local residents toward military families and the degree to which crime and racial tension are problems in the local community. It was expected that this component would have a negative effect on retention. An officer who was satisfied with the community attitudes might want to stay in that location. Again, due to the change of duty station policies, the only way to stay at the location would be to leave the service. Likewise, an officer who is dissatisfied may request to be moved at an earlier date than anticipated.

TABLE 4.9

SATISFACTION WITH COMMUNITY ATTITUDES FACTOR COMPONENTS

Factor Name	Variables	Questionnaire Item
FACTOR5	RACIAL TENSION	O21E20D
	CRIME	O21E20C
	ATTITUDES OF LOCALS	O20E19I

B. RESULTS

Tables 4.10 and 4.11 display the statistical results of the logistic regression model. The model had a Chi-square score of 84.46 with 20 degrees of freedom and was significant at the one percent level. The model correctly predicted 66.3 percent of the "stayers," 69.4 percent of the "leavers," and overall correctly predicted 67.8 percent of the sample. This is an improvement over the 52.6 percent of the "stayers" that could be correctly estimated without using the model.

TABLE 4.10

MODEL VALIDITY

Actual	Predicted		Total
	Leavers	Stayers	
LEAVERS	69.4%	30.6%	216
STAYERS	33.7%	66.3%	240
TOTAL	231	225	456

Actual percentage remaining on active duty: 52.6%
Percentage correctly classified: 67.8%

TABLE 4.11

STATISTICAL RESULTS FOR THE LOGISTIC REGRESSION MODEL

Variable	Beta Value	Probability Value
INTERCEPT	-0.060	0.892
MNC	0.207	0.413
MWC*	0.785	0.007
ACADEMY#	0.673	0.127
PLC	0.214	0.387
ROTC*	1.078	0.001
COMBSUPP**	-0.624	0.024
AVIATOR	-0.066	0.832
AVSUPP	-0.456	0.296
EARLY	-0.126	0.789
LATE	0.111	0.725
MINORITY#	0.620	0.145
GOVT	-0.074	0.758
YOS	0.072	0.471
YPRESLOC	-0.070	0.613
GOOD	-0.389	0.253
FACTOR1*	0.582	0.001
FACTOR2*	0.524	0.001
FACTOR3	-0.095	0.464
FACTOR4	-0.057	0.652
FACTOR5	-0.018	0.880

* = significant at the one percent level
** = significant at the five percent level
\# = significant at the 15 percent level

Of the 20 explanatory variables in the model, seven were statistically significant: Married with children from the family status group, service academy and Reserve Officer Training Corps from the commissioning source group, combat support from the occupation grouping, the race variable MINORITY, and the intrinsic and extrinsic job satisfaction factor components.

Table 4.12 displays the results of the model in regard to the partial effects and significance level of each explanatory variable. The Base Case individual for the model was: marital status as single, commissioning source as OCS or other, military occupational specialty (MOS) as combat arms, age at entry as normal (between 21 and 24 years of age), race as Caucasian, and current housing as off-base. The average value for years of service was 3.5 and the average value for years at present location was 1.4. The Base Case individual had a probability of staying of .524. Except for commissioning source and MOS, the majority of respondents were grouped in these categories. OCS or other commissioning source and combat arms specialty were close to being the majority groupings and it was believed that these categories represented the most likely characteristics of the "average" officer.

The married-with-children variable was significant at the one percent level while the married-no-children variable was not statistically significant. If an officer was married and had children he would have an 18.3 percent higher probability than a single individual of remaining on active duty. An officer who was married and had no children only had a 5.1 percent higher probability than a single individual of remaining on

active duty. These variables had positive Beta values which could reflect that as an officer gains family responsibilities the opportunity cost of leaving the service is higher as compared to that of an officer who is single and that married officers are more inclined to remain on active duty.

TABLE 4.12

PARTIAL EFFECTS TABLE

Variable	**Partial Effect**
MNC	0.051
MWC*	0.183
ACADEMY#	0.159
PLC	0.053
ROTC*	0.240
COMBSUPP**	-0.153
AVIATOR	-0.017
AVSUPP	-0.113
EARLY	-0.032
LATE	0.028
MINORITY#	0.148
GOVT	-0.019
YOS	0.018
YPRESLOC	-0.018
GOOD	-0.097
FACTOR1*	0.119
FACTOR2*	0.105
FACTOR3	-0.021
FACTOR4	-0.012
FACTOR5	-0.004

Base Case Probability = 0.524

* = significant at the one percent level
** = significant at the five percent level
\# = significant at the fifteen percent level

The commissioning source variables for service academy and ROTC graduates were significant at the 15 and one percent levels, respectively, while the Platoon Leaders Class variable was not statistically significant. The Beta values for these variables were positive, which indicates that graduates from these commissioning sources remain on active duty at higher rates than OCS graduates. An academy graduate had a 15.9 percent higher probability of remaining on active duty and an ROTC graduate had a 24.0 percent higher probability as compared to an OCS or other commissioning source graduate. A PLC graduate had a 5.3 percent higher probability. Part of this can be explained by the fact that all of the academy graduates and most of the ROTC graduates receive regular commissions, as compared to reserve commissions for OCS and other graduates. Officers with regular commissions can remain on active duty without having to apply for augmentation. Reserve officers have to compete through the augmentation process for a limited number of available openings.

The military occupational specialty variable for combat support was significant at the five percent level, while the aviator and aviation support variables were not statistically significant. The Beta values for these variables were all negative, which indicates that these officers are more inclined to leave active duty than their combat arms counterparts. An officer in one of the combat support specialties is 15.3 percent less likely to remain on active duty. An aviator is 1.7 percent less likely and an officer with an aviation support MOS is 11.3 percent less likely to remain on active duty. This may show that these specialties have acquired skills

that can be more readily transferred into the private sector than skills acquired through the combat arms specialty.

The race variable MINORITY was significant at the 15 percent level. The Beta value for this variable was positive, which indicates that minority officers stay at higher rates than Caucasian officers. A minority officer had a 14.8 percent higher probability of remaining on active duty as compared to a Caucasian officer. This substantiates previous findings that minority service members have higher retention rates, which could reflect lower opportunities for other employment.

The intrinsic and extrinsic job satisfaction factors were both significant at the one percent level. Their Beta values were also positive, which indicates that increases in these factors would lead to increases in the probability of remaining on active duty. An increase of one standard deviation in the intrinsic factor (FACTOR1) would increase an officer's probability of remaining on active duty by 11.9 percent. A similar increase in the extrinsic factor (FACTOR2) would lead to an increase of 10.5 percent.

The negative value for the health/retirement benefits factor component was a surprise. Although this factor was not significant, the sign indicates that as satisfaction with health/retirement benefits increases, the probability of remaining on active duty decreases. An increase of one standard deviation for this factor would lead to a decrease of 2.1 percent. The coefficient for this variable was -0.095. This value is extremely close to zero and is not statistically significant, so the sign could just as well be positive. This variable could also be collinear with another explanatory variable.

The satisfaction with current location and satisfaction with community attitudes were not statistically significant and their Beta values were negative (-0.057 and -0.018, respectively). These values are extremely close to zero and are not statistically significant, so the signs could just as well be positive. These variables could also be collinear with other explanatory variables. As satisfaction with these variables increases, the probability of remaining on active duty decreases. When officers become more satisfied with their current location and more satisfied with community attitudes, perhaps they would want to remain at these locations. In order to remain within a specific community, the officer would leave active duty rather than be transferred to another location. An increase of one standard deviation for these factors results in decreases of 1.2 percent, and 0.4 percent for FACTOR4 and FACTOR5, respectively.

The age at entry variables were not statistically significant, nor were the time/tenure variables, the perception of job opportunities variable, and the variable for current housing. The Beta value was negative for early age at entry and positive for late age at entry. This indicates that officers who join before age 21 are less likely to remain on active duty, while officers who join after age 24 are more likely to remain on active duty. Older officers are more likely to be married and have dependents than younger officers. Older officers may investigate more fully the consequences of their decisions because of their maturity as compared to younger officers.

The years of service variable had a positive Beta value, which indicates that the longer an officer serves, the more likely he is to remain on active duty. Intuitively, this makes sense. The years at present location had a negative Beta value, which indicates that the longer an officer remains at his present location, the less likely he is to stay on active duty. The longer an officer stays at a particular location, the more ties he has to that location (e.g., a spouse that works) and it may become more difficult to leave.

The perception of external job opportunities variable had a negative Beta value. This indicates that when an officer's positive perceptions about alternative work opportunities increase, he is less likely to remain on active duty. If an officer thinks his chances of finding private sector employment are good, he is more apt to investigate his actual opportunities by doing some job searching. This job search could lead to job turnover—leaving active duty.

V. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS AND POLICY IMPLICATIONS

This thesis investigated the factors which influence the retention of male, junior Marine Corps officers who are serving within their initial obligated service requirement. A multivariate logit regression model was estimated using these factors to determine their relative importance in explaining differences in the actual retention behavior of these officers.

The factors which most strongly influence male, junior officers to remain on active duty beyond their initial service obligation are their commissioning source, marital/dependent status, military occupational specialty, race, and intrinsic and extrinsic job satisfaction factors. The variables comprising these job satisfaction components are listed in Tables 5.1 and 5.2.

An officer who was commissioned from one of the service academies or from an ROTC program had a higher probability than an OCS graduate of remaining on active duty beyond his initial service obligation. This result was expected, however it is surprising that ROTC graduates remain at a higher rate (24%) than service academy graduates (16%). All service academy graduates receive regular commissions. Only ROTC scholarship graduates receive regular commissions while ROTC non-scholarship graduates receive reserve commissions. As a group, ROTC graduates still remain on active duty at higher rates than service

TABLE 5.1

THE INTRINSIC JOB SATISFACTION COMPONENT

SATISFACTION WITH CO-WORKERS
HAPPY WITH JOB
FRIENDSHIPS
SATISFACTION WITH WORK CONDITIONS
PERSONAL FREEDOM
OPPORTUNITY TO SERVE THE COUNTRY

TABLE 5.2

THE EXTRINSIC JOB SATISFACTION COMPONENT

SATISFACTION WITH:
PROMOTIONS
JOB SECURITY
JOB TRAINING/IN-SERVICE EDUCATION
VEAP BENEFITS/POST-SERVICE EDUCATION
COMMISSARY SERVICES
PAY AND ALLOWANCES

academy graduates. Officers with regular commissions can remain on active duty without having to apply for augmentation. Reserve officers have to compete through the augmentation process for a limited number of available openings. Reserve officers would not be expected to remain on active duty at the same or higher rates as regular officers.

Since 1980, the services have relied more on the service academies and ROTC as commissioning sources. In 1980, nine percent of new officers came from the service academies. In 1989, the percentage of service

academy graduates increased to 12 percent. In 1980, 25 percent of new officers came from ROTC. In 1989, the percentage of ROTC graduates increased to 37 percent. According to CBO sources, the Navy spends an average of $153,000 to produce an officer through the Naval Academy, $53,000 for an ROTC scholarship student, and $20,000 for an officer who graduates from Officer Candidate School (OCS) [Ref. 25:p. 4]. Based on this study, the Navy/Marine Corps spends an extra $33,000 for an ROTC scholarship student who is 24 percent more likely to remain on active duty than his OCS counterpart. An extra $133,000 is spent on a Naval Academy graduate who is 16 percent more likely to stay than his OCS counterpart.

An implication of these results is that the Marine Corps should reduce the number of officers commissioned by the service academies and increase the numbers of officers commissioned through the ROTC programs. If the reduction of service academy graduates is offset by a commensurate increase in ROTC non-scholarship graduates, there will be more officers with reserve commissions in the officer corps. Having more reserve officers will produce more competition in the augmentation process, but through this process the Marine Corps will be able to choose only the most qualified and productive officers to remain on active duty.

An officer who is married and has children has an 18.3 percent higher probability of remaining on active duty than a single officer. This indicates that recent efforts to improve military family life are justified and that these efforts should promote increased retention of these officers. More than half of the officers in this survey were married and

43 percent of these married officers had children. It is recommended that increased emphasis be placed on family programs and facilities at naval and Marine bases. In addition, of the married officers in this sample, 57 percent had working spouses. As the number of dual-income military families increases, there will be an increased need for programs such as day-care facilities, employment seminars, and placement services for military spouses.

Officers in the combat support specialties are 15.3 percent less likely to remain on active duty than their combat arms counterparts. This factor may have to be considered when deciding how many openings in these fields will be made available to new lieutenants. Many reserve combat arms officers (who are retained through the augmentation process) are retained with the provision that they move into the combat support specialties. In addition, recent programs have been instituted to assign secondary military occupational specialties to qualified officers of the combat arms and combat support fields. These practices may need to be continued if support billets are to be filled by qualified officers in the face of possible force reductions in the near future. It is recommended that more officers be assigned primary or secondary specialties in the combat support field to overcome the reduced likelihood of retention found in these specialties.

Minority officers are 14.8 percent more likely to remain on active duty than Caucasian officers. Attracting more minority candidates to the service has been the goal of marine recruiters for some time. The results of this model indicate that this goal should be maintained. It is often

viewed as beneficial to have at least the same representation of minority officers as minority enlisted members in the service. It is recommended that minority officers be commissioned at a rate equal to the representation of minority enlisted members in the Marine Corps.

It was surprising that intrinsic job satisfaction factors had a slightly stronger influence on retention than extrinsic factors. Intrinsic factors are difficult to affect directly, but areas which policy makers could influence include working conditions and personal freedom or autonomy. Policy makers could make improvements to the facilities on military bases and continue to provide junior officers with commensurate responsibilities. These efforts influence overall intrinsic job satisfaction, which in turn would result in increased retention.

Actions to influence extrinsic job satisfaction factors directly are more easily undertaken. Such actions might include: providing opportunities for promotion at the same stages in an officer's career as other services, providing appropriate and effective training, maintaining post-service education benefits, improving commissary services, and protecting military pay. These policies would influence overall extrinsic job satisfaction and would, in turn, also be expected to result in increased retention.

Intrinsic and extrinsic factors which affect job satisfaction should be monitored through surveys such as the DOD survey on a more-frequent basis. Actions taken to improve individual factors such as working conditions, promotions, job training, and job security could have profound effects on the retention of junior officers. The combined effect of a one

standard deviation increase in both the intrinsic and extrinsic job satisfaction components would result in an increase of the probability of remaining on active duty by 22.4 percent.

The importance of these intrinsic and extrinsic job satisfaction components is reflected in the June 25, 1990 issue of the *Navy Times*, which provides a listing of the top 10 "satisfiers" which explain why Navy officers stay. They are: (1) meaningful/challenging work; (2) positions of responsibility/authority; (3) use of abilities, skills, and education; (4) opportunity to serve my country; (5) career in a given subspecialty/designator; (6) military retirement; (7) good pay and allowances; (8) opportunity to show initiative; (9) opportunity to command; and (10) Navy lifestyle/esprit de corps. [Ref. 26:p. 14]

B. FUTURE RESEARCH

It is recommended that future surveys sample more minorities and females so that separate models can be studied for these service members. In addition, similar studies should be completed for the other services to identify the similarities and differences among the services within DOD.

Surveys such as the *1985 DOD Survey of Officer and Enlisted Personnel* should be continued. They provide a great deal of information on the behavior of service members. Less-detailed surveys could be conducted on a more-frequent basis and follow-up surveys could provide information on how the attitudes and behavior of respondents change over time. Results of exit surveys and matched data (such as the Member File used in this study) should be analyzed to provide information on

actual retention behavior. Information based on actual behavior is more robust than self-reported data.

Schmidt (1982) stated that of the married naval officers in his study, 30 percent had working spouses in 1978. The spouse's income represented an average of 16 percent of the total family income. Ashcraft (1987) stated that of the married naval officers in his study, 67 percent had working spouses in 1984, which accounted for an average of 20.5 percent of total family income [Ref. 10:pp. 48–49]. In this study, of the married Marine officers, 57 percent had working spouses in 1984, which represented an average of 26.8 percent of total family income.

As in Ashcraft's study, there has been a dramatic rise in the number of working spouses in military families since 1978. Working spouses in 1984 accounted for a greater percentage of total family income than working spouses did in 1978. Although spouse's income was found to be not statistically significant in Ashcraft's study and was not used as a variable in this study, such a high percentage of dual-income couples may have an effect on policy decisions. As working spouses hold more profitable positions and provide higher percentages of the total family income, officers with working spouses may be less inclined to accept transfers to new duty stations. Programs such as military spouse employment seminars and placement services for military spouses may help to overcome this resistance.

APPENDIX

ROTATED FACTOR PATTERN

SAS NAME	FACTOR1	FACTOR2	FACTOR3	FACTOR4	FACTOR5	FULL NAME
O109105C	0.73807	*	*	*	*	CO-WORKERS
O109105J	0.54072	0.37544	*	*	*	HAPPY WITH JOB
O109105B	0.53213	*	*	*	*	FRIENDSHIPS
O109105N	0.46882	0.42595	*	*	*	WORK CONDITIONS
O1091O5A	0.41879	0.24702	*	*	*	PERSONAL FREEDOM
O109105I	0.37348	0.21029	*	*	*	SERVE COUNTRY
O109105K	*	0.73011	*	*	*	PROMOTIONS
0109105M	*	0.51387	*	*	*	JOB SECURITY
O109105L	0.27223	0.43691	*	*	*	JOB TRAINING
O109105O	*	0.34679	0.26764	*	*	VEAP BENEFITS
O109105R	*	0.33419	0.22989	*	*	COMMISSARY SERVICES
O109105E	0.22019	0.29294	0.27317	*	*	PAY
O1091O5P	*	0.20189	0.81052	*	*	MEDICAL CARE
O109105Q	*	*	0.73075	*	*	DENTAL CARE
O109105H	0.24200	0.21397	0.24939	*	*	RETIREMENT
O20E19B	*	*	*	0.75782	*	DISTANCE
O20E19A	*	*	*	0.63642	*	CLIMATE
O20E19H	*	*	*	0.59479	*	RECREATION
O21E20D	*	*	*	*	0.82530	RACIAL TENSION
O21E20C	*	*	*	*	0.65026	CRIME
O20E19I	*	*	*	*	-0.37196	ATTITUDES OF LOCALS

* = values less than 0.2

LIST OF REFERENCES

1. Doering, Z. D., and Grissmer, D. W., *Active and Reserve Force Attrition and Retention: A Selected Review of Research and Methods*, The Rand Corporation, Report No. P-7007, Santa Monica, California, 1985.

2. O'Donohue, Daniel J., *First-Term Retention of Enlisted Selected Marine Corps (SMCR) Reservists*, Master's Thesis, Naval Postgraduate School, Monterey, California, December 1988.

3. Muchinsky, Paul M., *Psychology Applied to Work: An Introduction to Industrial and Organizational Psychology*, The Dorsey Press, Chicago, Illinois, 1983.

4. Vroom, V. H., *Work and Motivation*, John Wiley and Sons, Inc., New York, N.Y.,1964.

5. Albiso, John R., *The Effect of Race on Determinants of Job Satisfaction*, Master's Thesis, Naval Postgraduate School, Monterey, California, December 1985.

6. Cooper, Barrie L., Nebeker, Delbert M., and Riedel, James A., *Incentive Magnitude, Job Satisfaction, Perceived Stress, and Performance: Interrelationships in an Organizational Simulation*, Navy Personnel Research and Development Center, San Diego, California, July 1987.

7. Arnold, H., and Feldman, D., "A Multivariate Analysis of the Determinants of Job Turnover," *Journal of Applied Psychology*, v. 76, no. 3, pp. 350-360, 1982.

8. Cotton, J. L., and Tuttle, J. M., "Employee Turnover: A Meta-Analysis and Review with Implications for Research," *Academy of Management Review*, v. 62, no. 2, pp. 55-70, 1986.

9. Lee, T. W., and Mowday, R. T., "Voluntarily Leaving an Organization: An Empirical Investigation of Steers and Mowday's Model of Turnover," *Academy of Management Journal*, v. 30, no. 4, pp. 721-743, 1987.

10. Ashcraft, Raymond J., *An Analysis of the Factors Affecting the Career Orientation of Junior URL Naval Officers*, Master's Thesis, Naval Postgraduate School, Monterey, California, June 1987.

11. Fitzgerald, James L., *An Application of Utility Theory to the Problem of Junior Officer Retention in the U.S. Navy*, Master's Thesis, Naval Postgraduate School, Monterey, California, 1964.

12. Lopez, Thomas J., *Retention of Junior Officers in the Surface Navy*, Master's Thesis, Naval Postgraduate School, Monterey, California, June 1973.

13. Cook, Virgil G., *Naval Aviator Retention: Predicting Retention and Identifying Related Variables*, Master's Thesis, Naval Postgraduate School, Monterey, California, June 1979.

14. Schmidt, Wesley, H., *Factors Influencing the Career Orientation of Junior Officers in the United States Navy*, Master's Thesis, Naval Postgraduate School, Monterey, California, December 1982.

15. Cain, Russell L., *Socioeconomic and Personal Variables Effecting* [sic] *Retention of Medical Officers*, Master's Thesis, Naval Postgraduate School, Monterey, California, October 1982.

16. Lensing, Susan B., *A Model of Career Orientation for Military Nurse Corps Officers*, Master's Thesis, Naval Postgraduate School, Monterey, California, December 1984.

17. Menifee, James T., *Factors Affecting the Organizational Commitment of Military Physicians*, Master's Thesis, Naval Postgraduate School, Monterey, California, March 1984.

18. Siggerud, Dan-Norman, *Retention Intention Among U.S. Navy's Enlisted Personnel: An Analysis of Social, Environmental, and Economical Factors*, Master's Thesis, Naval Postgraduate School, Monterey, California, March 1981.

19. Kreutner, Steve M., Social, *Economic, and Behavioral Differences Among Enlisted Personnel Based on Age at Service Entry*, Master's Thesis, Naval Postgraduate School, Monterey, California, October 1982.

20. Orvis, Bruce R., *Forecasting Enlistment Actions From Intention Information: Validity and Improvement*, The Rand Corporation, Report No. N-1954-MRAL, Santa Monica, California, December 1982.

21. Christensen, Sandra L., *A Multivariate Analysis of Navy First Term Enlisted Turnover Intentions*, Master's Thesis, Naval Postgraduate School, Monterey, California, March 1983.

22. Randall, Jeffrey S., *Factors Influencing the Retention of Noncommissioned and Staff Noncommissioned Officers in the Selected Marine Corps Reserve*, Master's Thesis, Naval Postgraduate School, Monterey, California, December 1989.

23. SAS Institute Inc., *SAS User's Guide: Statistics*, Version 5, 1985.

24. Doering, Z., et al., *1985 DOD Survey of Officer and Enlisted Personnel User's Manual and Codebook*, Defense Manpower Data Center, Arlington, Va., June 1986.

25. Maze, Rick, "Methods for Reducing Officer Commissionings Are Studied," *Navy Times*, 39th year, no. 37, p. 4, 25 June 1990.

26. Burlage, John, "What's My Future with the Navy?" *Navy Times*, 39th year, no. 37, pp. 14-15, 25 June 1990.

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